INTERNATIONAL BULLETIN
OF PLANT PROTECTION

1934 No. 1

DISCOVERIES AND CURRENT EVENTS *

French North Africa: The Desert Locust (*Schistocerca gregaria*) (1).

ALGERIA.

4 November 1933. — A very large red swarm coming from the S. passed Garet ben Nana (180 km N. of El-Goléa) at 10 a. m. flying N.
A pink swarm coming from the S. passed Medjeira (on the camel track from Ouargla to Flatters, 65 km from Ouargla), flying N. driven by the wind.

5 November 1933. — A red swarm coming from the S. settled near Djafou (100 km N. of Ghardaïa).

6 November 1933. — A pink swarm coming from the S. settled on the palm plantation of Beni Abbès.

7 November 1933. — A pink swarm coming from the S. W. passed near Adjadja and Sidi Knouiled (7 to 10 km E. of Ouargla), flying N. W.

12 November 1933. — A small pink swarm settled at 2 p. m. near Bordj d'Ouargla. Took flight again at 3.30 p. m. flying N. driven by a S. wind.

16 November 1933. — A large swarm coming from the S. settled 10 km S. E. of Touggourt.

22 November 1933. — A large red swarm coming from the S. settled at Moghrar Tahtani (Aïn Sefra).

MOROCCO.

1 November 1933. — A pink swarm, 4 × 1 km, settled at Adrar Tackoucht (territory of Agadir).

5 November 1933. — A pink swarm coming from the S. settled at Mhammid (territory of Ouarzazate).

6 November 1933. — A pink swarm, 3 × 4 km, coming from the S. W. settled at Hafaïa (territory of Agadir). Took flight towards the N. E.

* Under this and the next heading the countries are arranged in French alphabetical order.

(1) Communication from the Government General of Algeria (Direction des Services Economiques) to the International Institute of Agriculture.

A pink swarm of medium density coming from the S. W. passed Riçani and Dolla el Altrous (Algeria-Morocco frontier) flying N. E.

7 November 1933. — Swarms settled at Zgnid, Zagora, Tazzarine (territory of Ouarzazate).

9 November 1933. — A pink swarm coming from the N. N. E. settled at Taouz, to the S. E. of Tafilalet (Algeria-Morocco frontier), departed flying N.

12 November 1933. — A sparse pink swarm coming from the E. settled at Tesgui (territory of Agadir).

13 November 1933. — A sparse pink swarm settled at Ida ou Bouzia Arbalou (control of the Haha Chiadma, Mogador) from 13 to 21 November. Flew away E.

A pink swarm of 1 × 1 km, reported at Ida ou Zal (region of Marakech) flying S. W.

14 November 1933. — A pink swarm of 2 × 4 km coming from the W. settled at Taghrat Hesfassen (territory of Agadir). Departed on the 15th flying E.

A yellow and pink swarm coming from the S. settled at Ifid (Ida ou Ziki) (region of Marrakech). Departed on the 15th flying towards Tizi n'Machou.

16 November 1933. — A pink swarm coming from the S. settled at Aïn Sabir (Algeria-Morocco frontier). The locusts were killed by frost.

17 November 1933. — A pink swarm of 4 × 1 km coming from the S. reported at Tazzouguert (Algeria-Morocco frontier), flying N.

Pink swarms reported at Aït Imesker, Aourir n'Aït Naceur, Tle a (region of Aït Tiukert, territory of Agadir).

19 November 1933. — Large pink swarms coming from the E. settled at Tinghir Todra (territory of Ouarzazate) and departed W.

A pink swarm of 10 × 3 km coming from the E. settled at Boumaln Territory of Ouarzazate).

A pink swarm of 3 × 2 km coming from the S. E. settled at Ouled Kourra territory of Agadir). Left on the 20th, flying N.

21 November 1933. — A pink swarm coming from the S. settled at Saheli Ksar Barania (Algeria-Morocco frontier).

A pink swarm of 3 × 1 km coming from the E. settled at Aït Tameur (control of the Haha Chiadma, Modagor).

24 November 1933. — A pink swarm of 5 × 2 km settled at the Djebel Taskatine (control of the Haha Chiadma, Mogador).

25 November 1933. — A pink swarm of 7 × 5 km coming from the S. settled at Ouled Saïd of Agadir).

27 November 1933. — A pink swarm settled at Aït Saïd (Algeria-Morocco frontier) departed, flying N.

28 November 1933. — A pink swarm coming from the S. passed Irherm (territory of Agadir) at 2 p. m. flying N.

A pink swarm of 1 × 2 km coming from the E. settled at Aït Tameur, Tassela Imzi (control of the Haha Chiadma, Mogador).

Angola: Locust Movements (1).

4 May 1933. — Large swarms settled in the region of Bibala (Vila Arriaga), district of Mossamedes, and caused very serious damage to the vegetables and native crops. In the reports received neither the origin of the swarms nor the colour of the insects is mentioned ; it is thought however that the species was *Nomadacris septemfasciata.*

12 May 1933. — Between 60 and 80 km along the Quipungo-Sá da Bandeira road, district of Huila, a great quantity of hoppers were seen, and in the vicinity of Sá da Bandeira a small quantity of adults.

13 May 1933. — Several large swarms coming from the hill region of Huila (south east) settled near Humpata and caused serious damage to the European crops.

14 May 1933. — An enormous swarm which had settled the previous day in the neighbourhood of Humpata took flight in a northerly direction, covering an area of 20 × 3 to 4 km. The species was *N. septemfasciata.*

No further news relating to locust movements was received during the month from Angola.

Australia: Summary of Plant Diseases recorded in New South Wales for the Season 1932-1933 (2).

CEREALS AND FIELD CROPS.

Wheat: Root Rot (*Helminthosporium sativum*) and Take-all (*Ophiobolus graminis*) were more prevalent than in previous seasons. Root rots caused by *Fusarium culmorum, Wojnowicia graminis* and *Brachysporium* sp. were also recorded. *Fusarium* sp. was also associated with a head-blight condition. Rust (*Puccinia graminis*), although in evidence, did not develop seriously. Flag Smut (*Urocystis tritici*) was prevalent in some areas but is less in evidence on farms where resistant varieties are cultivated. Loose Smut (*Ustilago tritici*) caused slight reduction in yield in some crops. Bunt (*Tilletia tritici* and *T. levis*) was observed in crops where seed treatment was omitted. Glume Blotch (*Septoria nodorum*) and Leaf Spot (*Septoria tritici*) were of local importance in some varieties, and although Basal Glume Rot (*Bacterium atrofaciens*) was recorded from additional localities the disease caused negligible loss. Non-parasitic conditions included frost injury, haying off as a result of dry weather and crinkle joint.

(1) Communication from the Director of the Laboratory of Plant Pathology and Agricultural Entomology of Luanda, transmitted to the International Institute of Agriculture by the Government of the Colony.

(2) Communication from the official correspondent of the Institute, Mr. R. J. NOBLE, Ph. D., M. Sc., B. Sc. Agr., Biologist, Department of Agriculture, Sydney, New South Wales, Australia

Oats: The Smut diseases (*Ustilago avenae* and *U. levis*) caused losses in individual crops. Other records of less importance included Stem Rust (*Puccinia graminis*) and Leaf Spot (*Helminthosporium avenae*).

Barley: Loose and Covered Smuts (*Ustilago nuda* and *U. hordei*) were commonly observed. Scald (*Rhynchosporium secalis*) was in evidence in susceptible varieties. Net Blotch (*Helminthosporium teres*) and Stripe (*Helminthosporium gramineum*) were also reported.

Sugar cane: Gummosis (*Bacterium vascularum*) was not prevalent.

Lucerne: Diseases of importance included Stem Nematode (*Tylenchus dipsaci*) and Rosette (undetermined). Mildew (*Peronospora trifoliorum*), Rust (*Uromyces striatus*), Leaf Spot (*Pseudopeziza medicaginis*), Yellow Leaf Blotch (*Pyrenopeziza medicaginis*) and Stem Blight (*Bacterium medicaginis*) were also reported. *Ascochyta* sp., *Verticillium* sp. and *Fusarium* sp. were associated with wilted conditions, but possibly were only of secondary inportance.

Tobacco: Downy Mildew (Blue Mould – *Peronospora* sp.) was again the most serious disease affecting seedlings. Total losses were incurred in some instances.

Fruit crops.

Apples and Pears: Black Spot (*Venturia inaequalis* and *V. pirina*) caused serious losses in some areas. The physiological conditions, internal cork, crinkle, orchard and storage pit, together with water-core, were also of importance. Measles, Graft-rot (*Polystictus versicolor*), Root-rot (*Armillaria mellea*) were also reported.

Stone fruits: Brown Rot (*Sclerotinia fructicola*) caused serious loss in coastal areas. Leaf Curl (*Exoascus deformans*) was unusually prevalent. Other records of interest included the Tan disease of cherries, physiological spotting of plum fruits and internal breakdown of flesh of peaches. Mildew (*Sphaerotheca pannosa*) was observed on nectarines. Rust was of importance only on early coastal varieties.

Citrus: Black Spot (*Phoma citricarpa*) caused heavy loss in coastal areas. Exanthema is now of little importance. Melanose (*Phomopsis citri*) and Scab (*Sporotrichum citri*) were prevalent in unsprayed orchards. Stem-end injury (*Colletotrichum gloeosporioides*) was associated with faulty handling of fruit. *Phytophthora parasitica* was reported as a cause of Collar Rot. Californian Dry Root Rot was also observed. Undetermined conditions include a blotch of grape fruits and oranges.

Grapes: The most prevalent diseases included Downy Mildew (*Plasmopara viticola*) and Black Spot (*Gloeosporium ampelophagum*). Powdery Mildew (*Uncinula necator*) was of less importance.

Miscellaneous fruits: Fig Mosaic is widespread but causes generally slight reduction in yield and quality. Passion fruit (*Passiflora edulis*) diseases

of importance were Brown Spot (*Macrosporium* sp.) and Woodiness (virus). Scab (*Cladosporium* sp.) was of less importance. Pecan Rosette (physiological) was recorded for the first time. Loquats (*Eriobotrya* sp.) were affected with Fleck (*Entomosporium maculatum*) and Black Spot (*Fusicladium eriobotryae*). Bunchy Top (virus) of bananas was less prevalent. Banana Root Rot (*Armillaria mellea*) was reported in some areas.

Vegetable Crops.

Beans: Bacterial Blight (*Bacterium medicaginis* var. *phaseolicola*) was of most importance. Anthracnose (*Colletotrichum lindemuthianum*), Root Rot (*Fusarium martii phaseoli*), Leaf Spot (*Isariopsis* sp.) and Mosaic were also recorded.

Cabbages and cauliflowers: Black Rot (*Bacterium campestre*) was the most prevalent condition. Whiptail (physiological) was recorded in untreated areas.

Potatoes: Virus diseases (particularly leaf roll) were prevalent in most crops. Other diseases of importance included Scab (*Rhizoctonia solani* and *Actinomyces scabies*) and Eelworms. Aucuba mosaic, Blackleg (*Bacillus atrosepticus*), Bacterial Wilt (*B. solanacearum*), Silver Scurf (*Spondylocladium atrovirens*), Late Blight (*Phytophthora infestans*), Early Blight (*Alternaria solani*) and Dry Rot (*Fusarium*) were also recorded.

Tomatoes: Most of common diseases were again reported. Big Bud (virus) was less prevalent than in the previous season. Late Blight (*Phytophthora infestans*) causes loss in young plants. *B. solanacearum* was also recorded. Root rots were caused mainly by *Fusarium lycopersici*, but *Verticillium alboatrum* and *Sclerotinia* sp. were also in evidence.

Miscellaneous vegetables: The following diseases were recorded: Mildew (*Bremia lactucae*) on lettuce, Leaf Spot (*Cercosporella albomaculans*) on turnip, Late Blight (*Septoria apii*) on celery and Mildew (*Peronospora schleideni*) in onions.

Miscellaneous plants.

The following diseases were noted during the season, in some cases as first records for the State: White Rust (*Albugo* sp.) in Aster, Mosaic (virus) on Zinnia and Iceland poppy (*Papaver nudicaule*), Bacterial Leaf Spot of delphinium (*Bacterium delphinii*), Leaf Spot of Phlox (*Septoria divaricata*), Canker (*Pestalozzia* sp. associated) on Cypress (*Cupressus* sp.), Gall (*Bacterium savastanoi*) on Oleander (*Nerium*), Dieback (*Marssonia* sp.) on willow (*Salix* sp.), Leaf Spot (*Pestalozzia* sp. – associated) on Heuchera. Mushrooms (*Agaricus campestris*) were affected with Bubbles (*Mycogone perniciosa*) and the Plaster Mold (*Monilia fimicola*) was a source of loss in mushroom beds.

Eritrea: Locusts (1).

During November 1933 neither eggs, hoppers nor swarms of locusts were observed in the Colony.

British West Indies: Insect Pests (2).

The methods adopted for the control of Pink Bollworm (*Pectinophora gossypiella*) in cotton growing islands in the West Indies have given very satisfactory results for a period of years, but in 1931-32 this insect caused much more damage to the cotton crop than for several years previously. This appears to have been due not so much to unsatisfactory control measures as to unfavourable climatic conditions in 1931. In the case of early planted cotton 1931, the planting season was considerably extended on account of dry weather conditions, and late planted cotton experienced heavy rains in the fruiting season causing the loss of a large proportion of the first bolls of the fruiting period.

During the same season frequent showers and heavy rains interfered with the application of insecticides against the Cotton Leaf Caterpillar (*Alabama argillacea*). In 1932 the areas planted to cotton have been greatly reduced as a consequence of the depressed condition of the market. The crop planted and reaped in 1932 has been fairly free from insect attacks.

The Sugar Cane Froghopper (*Tomaspis saccharina*) in Trinidad was very abundant in certain localities and canes in these localities were heavily blighted in 1931. In spite of this, however, the sugar cane crop reaped in 1932 was a record one for the island. In Barbados, Antigua and St. Kitts the Small Moth Borer (*Diatraea saccharalis*) continues to be the principal pest of the sugar cane. In Barbados the work of production and liberation of the *Trichogramma* parasite has been continued and extended. The Government Entomologist and the planters believe that the results of this work justify further trials of this method of control of the Small Moth Borer. Introductions of the *Lixophaga* parasite have been made from Cuba into Antigua and St. Kitts in 1932 and it is believed that these introductions have been successful. The introductions have been made by Dr. J. G. Myers of the Empire Marketing Board.

Continued interest is being taken in the Arrowroot Leaf Roller (*Calpodes ethlius*) in St. Vincent and an officer has been appointed to work under the St. Vincent Arrowroot Association, on certain problems connected with arrowroot cultivation, with special reference to the methods of control to be employed for the Leaf Roller Caterpillar.

Cotton Stainers (*Dysdercus* spp.) at one time were the most serious pest of cotton in St. Vincent where a large proportion of the crop was lost from the effects of internal boll disease (*Nematospora*) following stainer attacks. Following on the campaign against these insects which included the destruction of

(1) Communication from the official correspondent of the Institute, Dr. Rolando GUIDOTTI, Chief of the Agricultural Office of Eritrea, transmitted by the Government of the Colony.

(2) Communication from the official correspondent of the Institute, Mr. H. A. BALLOU, M. Sc., Commissioner of Agriculture, Imperial College of Tropical Agriculture, Trinidad.

wild food plants, stainers became of much less importance. A change has been made in the planting season which allows the cotton to flower and ripen its bolls in the dry months of the year. The internal boll disease has become of very little importance and stainers continue to be found only in very small numbers during the cotton season.

The Sweet Potato Weevil (*Cylas formicarius*) has been reported as occurring in Anguilla and St. Kitts. This insect which was formerly recorded from Porto Rico and British Guiana has not been known previously to occur in the Lesser Antilles.

The West Indian Sweet Potato Weevil (*Euscepes batatae*) has recently been recorded as occurring in Trinidad. Although there was no previous record of the occurrence of this insect in that island, recent investigations indicate that it has been present for some years.

The Chinch Bug (*Blissus leucopterus*) has now been definitely recorded from Trinidad, Montserrat and St. Kitts. In Trinidad it is a pest of lawns and pastures, in Montserrat and St. Kitts it has been found damaging principally devil grass or Bahamas grass (*Capriola dactylon*) lawns.

The West Indian Fruit Fly (*Anastrepha serpentina*) has been recorded attacking grapefruit in Trinidad. The attacks have only been found on fruits that have been left too long on the tree and have become over-ripe.

The so-called Black Fly (*Aleurocanthus woglumi*) which had become a decided pest in Cuba is reported to have been very definitely controlled by the introduced parasite, *Eretmocerus serius*. This parasite has now been introduced into Jamaica where *Aleurocanthus* has become established. This aleurodid has not yet appeared in the Lesser Antilles.

Uruguay : Locust Invasions (1):

The species which periodically invades Uruguay is the South American Locust (*Schistocerca paranensis* Burm.), which normally lives in the tropical regions of South America and has permanent breeding grounds in the Chaco in Bolivia, Paraguay and Argentina. Its stay in Uruguay is relatively short for as soon as the insect reaches the adult stage it returns to its regions of origin. In the invasions which occur in July and August the adult is generally of a coloration varying from pink to russet, which it gradually loses toward the spring when it regains its specific colour.

Frequency and intensity of invasions.

In the period of 42 years comprised between 1890 and 1932-33 inclusive, 19 invasions were counted. By invasion is meant any appearance of the insect in the country even if no serious damage occurs nor any laying, or if the losses

(1) Communication from the official correspondents of the Institute, Messrs. Jaime Molins, Jr., Ingeniero agrónomo, Chief of the Section Fomento y Defensa Agrícola, Dirección de Agronomía, Ministerio de Industria, Montevideo, and Agustin Trujillo Peluffo, Ingeniero agrónomo, attached to the same Section.

in the invaded zone are of little importance. This zone generally includes two or three Departments situated along the banks of Rio Uruguay, bounding the Argentine province of Entre Rios.

Within the period mentioned 10 invasions only were important, which represents a theoretic average of 10/42 or 0.238 invasion per annum. This percentage is relatively low and would seem to reduce the importance of the menace. It should, however, be noted that in nearly all the preceding invasions the locusts caused catastrophic damage, destroying all the existing crops including vines, fruit trees and forests.

Within this period the invasions occurred as follows :—

1890-91 – Partial invasion of certain coastal Departments.
1892-93 – » » of Paysandu and Rio Negro.
1893-94 – » » of Artigas and Rivera.
1894-95 – » »
1896-97 – Heavy invasion covering 9/10th of the territory.
1908-09 – » » » 6/10th of the territory.
1909-10 – » » » 7/10th of the territory.
1910-11 – » » » 9/10th of the territory.
1914-15 – » » » half the territory.
1915-16 – » » » all the territory.
1916-17 – » » » 8/10th of the territory.
1917-18 – » » » all the territory.
1918-19 – Partial invasion of Lavalleja and Canelones.
1921-22 – » » of Salto, Paysandu, Rio Negro and Tacuarembo.
1922-23 – » » of Artigas and Salto.
1924-25 – Heavy invasion covering 8/10th of the territory.
1925-26 – Partial invasion of the Department of Paysandu.
1931-32 – Part of Artigas, Salto and Paysandu.
1932-33 – Heavy invasion covering the whole territory.

In all the serious invasions recorded the locusts entered the country from the north and west coast coming for the most part from the Argentine frontier partly also from the State of Rio Grande do Sul, Brazil. They gradually advanced toward the centre of the country as far as the eastern Departments, which is the least affected region. In this region Rocha, Maldonado and part of Treinta y Tres were invaded only three times during the whole period.

Season of Invasion.

The time of invasion during the period in question has been very variable but the invasions have always been more frequent in August. It should also be noted that with certain exceptions the early invasions in July

and August have been the most serious. The following list will give an exact idea :—

1890-91 –	Invasion occurred on	4 December.	
1892-93 –	» »	18 November.	
1893-94 –	» »	2 December.	
1894-95 –	» »	18 October.	
1896-97 –	» »	9 August	(Heavy invasion).
1908-09 –	» »	20 September	» »
1909-10 –	» »	23 August	» »
1910-11 –	» »	5 August	» »
1914-15 –	» »	1 August	» »
1915-16 –	» »	19 August	(Total invasion)
1916-17 –	» »	20 September.	
1917-18 –	» »	27 August	(Total invasion).
1918-19 –	» »	20 July.	
1921-22 –	» »	7 September.	
1922-23 –	» »	15 August.	
1924-25 –	» »	3 July	(Heavy invasion).
1925-26 –	» »	30 November.	
1931-32 –	» »	24 October.	
1932-33 –	» »	15 July	(Total invasion).

Of the total invasions registered, 3 were in July, 7 in August, 3 in September, 2 in October, 2 in November and 2 in December.

Time of laying and incubation period.

Laying never occurred in July and was very rare in August. In the early invasions the first laying took place in September, and in 1932 the first eggs were found on 15 September in the Department of Rivera, and then laying became general in all the invaded Departments.

The period between egg laying and the hatching of the « mosquita » is very variable and the extreme dates reported in the country vary from 20 to 50 days.

These variations are closely connected with meteorological factors. Heat accelerates the process of development and humidity when not acting alone, causes á shortening of the incubation period.

As a result of repeated observations the duration of the incubation period has been determined and it never varies greatly from the following figures :—

Incubation period in August.	50	days
» » from 1 to 20 September	45	»
» » from 20 September to 10 October	40	»
» » 10 to 30 October	35	»
» » 30 October to 15 November	25	»
» » 15 November to 31 January	20	»

Extent and density of laying.

The determination of the extent of the breeding areas is very difficult owing to the system of extensive cropping on the greater number of farms in Uruguay. It varies, moreover, according to the size of the adult swarms and according to the number of invasions occurring in the different zones. During the 1932 invasion as many as six successive layings were recorded in the same region. The locusts preferably chose for laying places which were little or not cultivated, roads, road ditches, ploughed land, preferring that which had not been recently tilled, wooded zones which are found along the rivers, streams, marshy land and waste land.

All these circumstances make an exact estimate of the zone occupied by locusts difficult.

In spite of these difficulties it may be said that the area of the breeding ground amounted to as much as 70 % of the total area of certain Departments, and that in certain regions there were found, as has been said above, as many as six layings in succession, while in the same zone the usual average was four layings. These figures will suffice to give an idea of the severity of the latest invasion which is the worst recorded and without precedent in extent, even as compared with isolated zones.

In 1932 a specific difference was noted in regard to the adult female which in all the previous invasions had laid once or twice, rarely three times, with a mortality of 20 to 25 % for each laying. During the 1932 invasion it was found on the contrary that there were as many as five consecutive layings with a mortality of only 10 %. This change has naturally increased the invaded area.

Hatching and development.

Hatching occurred within the incubation periods already recorded, the hatchings being more numerous within 25 and 35 days.

The larva at hatching was 79 mm. in length and reached the first hopper stage in five days (from 4 to 7 days), when it was 10 to 12 mm. in length, it reached the second stage in ten days (7 to 11 days), being then 18 to 20 mm. in length.

When hatched and throughout the hopper phase, the insect is called « mosquita » in the language of the country.

After 10 days (from 7 to 12 days), the insect reaches the third hopper stage, with a length of 26 to 30 mm.

After 11 days (9 to 13 days), the insect reaches the last hopper stage with a length of 26 to 45 mm. and reaches the perfect stage within the following ten days (9 to 14 days).

In this stage the insect takes the name of ' saltona ' ; at this time its voracity is extraordinary and causes it to move from place to place in search of food.

The ' langosta ' becomes finally adult within the 10 following days (9 to 14 days), and is then called ' voladora ' (from 44 to 58 days after hatching).

The adult male at this stage attains a length of 42 to 52 mm. and the female from 48 to 56 mm. ; the adult lives for 7 to 8 months.

When the adult stage is reached, the locust continues to live in the same places making small trial flights for about ten to 20 days and finally takes flight in a dense swarm in a north-north easterly direction, leaving the country to return to its place of origin and destroying in its path any crops which have previously escaped attack.

LEGISLATIVE AND ADMINISTRATIVE MEASURES

Algeria. — By Decree of the Governor General, dated 2 October 1933, the conditions for the importation into Algeria of potatoes, tomatoes and egg plants grown in France have been modified [see this *Bulletin*, 1933, No. 3, p. 59].

These products coming from zones infected with the Colorado beetle [*Leptinotarsa decemlineata*] or the zones of protection may be sent to destinations in Algeria only during the so-called winter period commencing 25 September of each year and ending 15 May of the following year, these extreme dates being modifiable by Decree of the Governor General.

Subject to the following conditions, however, it is allowed for the Syndicates for crop protection formed in France in conformity with the Law of 3 June 1927, to import into Algeria between 15 May and 25 September of each year, potatoes recognised as sound, clean and properly graded which have been harvested during the said period in land under the Syndicates whether in the protection zones or in zones infected with Colorado beetle, with the exception however, in the latter case, of potatoes coming from fields in which the presence of the pest has been ascertained, the transport of such potatoes being strictly forbidden.

The above mentioned conditions are as follows :—

(1) Consignment is subject to authorization granted to the Syndicates by the Minister of Agriculture.

(2) The consignments must be intended for consumption in towns with a population of at least 5,000 and may not be removed again from such towns.

(3) The potatoes must come from fields submitted to supervision by the agents of the Syndicate, inspected by the Ministry of Agriculture (Service of Plant Protection), and recognised free from Colorado beetle.

(4) Each consignment must be accompanied by a permit issued by an agent of the Service for Plant Protection conforming with the model annexed to the present Decree. This permit must be applied for in advance by the President of the Syndicate and on the application must be indicated the place of origin of the potatoes, the names and addresses of the producers, the names and addresses of the consignees and the premises which must be placed under the supervision of the Syndicate and be situated outside the fields of production.

The agent will issue the permit only on being assured that all the requirements indicated above have been observed. (*Journal Officiel de l'Algérie*, Alger, 20 octobre 1933, 7e année, nº 42, p. 757).

Germany. — New regulations, dated 27 September 1933, relating to the control of grape phylloxera [*Phylloxera vastatrix*] have been published.

Generally speaking, it is forbidden to grow vines other than the European varieties (*Vitis vinifera* and *V. silvestris*). The authorities are, however, allowed as an exceptional measure to cultivate certain other varieties of vines for use as rootstocks.

The establishment of a plantation of mother vines is the responsability of the State, which may, however, confer this right on bodies with a legal status.

Definitions are given of what is to be understood by infected (' verseucht ') suspected of being infected (' seuchenverdächtig ') and exposed to risk of infection (' seuchengefährdet ').

Each year a list of the localities recognised as infected, suspected of being infected or exposed to risk of infection will be published.

Vineyards are to be submitted to permanent official control. Any proposed new plantation must be notified to the police authorities and all required information supplied. The intention to destroy vines in infected localities must also be notified.

The permanent control will be carried out by the regional experts. For this purpose vineyards will be divided into districts of control, each district comprising an area up to 500 hectares of land under vines.

The experts will carry out regular inspection of their districts. They are authorised for this purpose to take samples of the roots and of whole vines. European vines on their own roots must be inspected at least every two years. Non-European vines and their hybrids growing in localities which are infected or suspected of being infected or exposed to risk of infection, must be examined each year to ascertain whether or not phylloxera galls are present on the leaves.

Any centre of infection must be enclosed and a notice posted forbidding entrance.

From any new centre samples must be taken and sent to the Biologische Reichsanstalt für Land-und Forstwirtschaft (Zweigstelle de Nauburg) for purposes of identification of the variety of phylloxera.

All vines growing in an infested area must be destroyed. The soil must be disinfected. Exceptions to this ruling may be allowed by the Minister of Agriculture in regard to non-European vines.

In cases of slightly infested localities a safety zone of 10 metres in width must be drawn round the centre of infection within which all the vines must be destroyed at latest in the following spring.

In seriously infected localities it will be necessary in carrying out the direct control campaign to take into consideration the more rapid reconstruction by means of vines grafted on resistant stocks which must follow later.

In cases in which contamination of the leaves is ascertained the area to be destroyed must be surrounded by a safety zone of at least 20 metres in width within which the aerial parts of the vines must be destroyed by fire.

In slightly infested localities and in cases in which infection of the roots only is found, the roots of the plants suspected of infection must be examined as soon as possible and this examination repeated twice within the course of the six following years.

In cases of leaf infection it will be required to examine at the end of about four weeks vines which are exposed to risk of infection and any suspected of infection in order to determine whether or not the parasite is present on the leaves or roots. This inspection must as far as possible be made vine by vine ; the inspection of the roots must be carried out again the following year and twice more within the six following years.

Plots which have been once infested may no longer be planted with European vines on their own roots.

This regulation applies also to any new vineyard to be planted in regions recognised as seriously infested.

It is forbidden to remove from communes recognised as infected vines, parts of vines, vine props and implements, manure and soil.

The last regulations are concerned with the trade in vines. It is prescribed *inter alia*, that rooted vines before being removed from a given region should be disinfected. Vines may not be sold on the markets or hawked. (*Amtliche Pflanzenschutzbestimmungen*, Berlin, 1. November 1933, Bd. V, Nr. 5, S. 134-140).

*** The new edition, dated 24 October 1933, of the Convention for the commerce in potatoes in Germany established at Berlin (' Berliner Vereinbarungen '), contains in paragraph 8 regulations relating to the commerce in seed potatoes.

The percentage of potatoes which by their external appearance or by a section are seen to be diseased, requires no notification if it is below 0.5 % ; it will entail a reduction in price if it does not exceed 4 % and the right of refusal if it exceeds 4 %.

This regulation does not apply to wet rot of potatoes (" Nassfaule "), nor to frost damage. For these defects the limit entailing the right to reduction in price is fixed at 3 % of the weight. A percentage of over 3 % entails the right to refusal.

Defects which do not affect the value of the potato as seed, such as skin lesions (" Schalenrissigkeit "), slight cases of rust spots (" Eisenfleckigkeit "), of scab (" Schorf "), and internal corky patches (" Pfropfenbildung "), do not require notification. Potatoes of which less than 10 % of the surface is covered with scab spots are considered as free from scab.

Any infection with wart disease [*Synchytrium endobioticum*] entails the right of refusal even if infection is not observed until after the potatoes are unloaded. (*Amtliche Pflanzenschutzbstimmungen*, Berlin, 1. November 1933, Bd. V, Nr. 5, S. 141-143).

Germany (Prussia). — By Police Ordinance of 8 September 1933 relating to the control of rats and field voles, regulations similar to those in force in the circumscription of Hadeln [see this *Bulletin*, 1933, No. 11, p. 249], have been enacted for the circumscription of Stade. In certain communes the control has been placed under the direction of the respective mayors who will cause it be undertaken by the Institute for Animal Diseases of the Chamber of Agriculture of Hanover, putting at the disposal of the Institute the necessary labour and distributing the costs of the control campaign, estimated at 60 Rpf per hectare, between the owners of the land treated. The above named Institute will supply the necessary means of control. (*Amtliche Pflanzenschutzbestimmungen*, Berlin, 1. November 1933, Bd. V, Nr. 5, S. 143-145).

Germany (Schleswig-Holstein). — By Police Ordinance, dated 4 July 1933, relating to the control of noxious plants, owners and holders of any cultivated or waste lands are obliged to destroy certain plants before they reach the end of the flowering period or maturation. The plants to which this ordinance applies are the following :— *Cuscuta*, *Chrysanthemum segetum*, *Chrys. leucanthemum*, *Senecio vernalis*, *Galinsoga parviflora* and *Sinapis arvensis*. (*Amtliche Pflanzenschutzbestimmungen*, Berlin, 1. November 1933, Bd. V, Nr. 5, S. 145).

Danzig. — By Decree of 7 October 1933, intended to prevent the introduction of potato wart disease (*Synchytriun endobioticum*), it is forbidden to import potatoes which are infected or suspected of being infected with this disease.

Any consignment of potatoes must be accompanied by an official certificate from the country of origin stating that inspection of the consignment has shown it to be free from wart disease and that it comes from a farm which is free from wart disease and that wart disease has never been found within a radius of 10 km. The certificate must also contain an exact description of the consignment giving detailed particulars concerning the variety, weight, number of packages, exact place of origin, etc. (*Amtliche Pflanzenschutzbestimmungen*, Berlin, 1. November 1933, Bd. V, Nr. 5, S. 146-147).

Spain. — By ' Orden ' of 4 December 1933 regulations are provided for the destruction of locust eggs during the winter in the various provinces of the Republic. (*Gaceta de Madrid*, Madrid, 7 diciembre 1933, año CCLXXXI, tomo IV, núm. 341, pág. 1577).

Italy. — By Royal Decree No. 1700 of 12 October 1933, the regulations were approved for Law No. 987 of 18 June 1931 containing enactments relating to the protection of cultivated plants and agricultural products against diseases and pests and to the services relating thereto, and to the application of the successive modifications of the said Law [see this *Bulletin*, 1931, No. 9, p. 166 ; 1932, No. 11, p. 185 ; 1933, No. 3, p. 62].

The regulations relate to the service for inspecting, reporting and treating plant diseases ; the Syndicates, voluntary and obligatory, for plant pro-

tection, and for crop improvement and finally certain rulings of a general character.

By plant diseases for the purposes of this Law are intended those of inorganic as well as organic origin (plant parasites, including noxious weeds, and animal parasites, including animals causing damage of any nature).

The regulations provide, *inter alia*, for the formation of a central bureau for plant protection under the Ministry of Agriculture and Forests. For the service of inspecting, reporting and treatment of plants, within the meaning of this Law, this bureau will utilise the following organizations:— Committee for Plant Protection, Institutions for Research and Scientific Experimentation in Phytopathology, Observatories for Plant Diseases and Provincial Commissariats for Plant Diseases. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 22 dicembre 1933, anno 74°, n. 295, pp. 5855-5870).

*** By Ministerial Decree of 18 November 1933 the communes of Appignano del Tronto and of Spinetoli in the province of Ascoli Piceno have been declared infected with grape phylloxera. (*Gazzetta Ufficiale del Regno d'Italia*, Roma, 29 novembre 1933, anno 74°, n. 276, p. 5423).

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The research of Mr. Paillot on immunity has resulted in the acknowledgement of the existence of different processes from those in the vertebrates. His recent discoveries in Aphididae tend moreover to modify the classic conception of the phenomenon of symbiosis. This should no longer be considered, at any rate in Aphididae, as a close association of two living beings each drawing equal benefit from the association, but as a normal bacterial infection controlled by reactions of immunity similar to those produced in the organism of insects inoculated with mildly pathogenic bacteria. As the writer says, the support of this hypothesis was one of the main purposes of the writing of this book. He wished to convince readers of the importance of a study of comparative pathology carried out systematically in all branches of the animal kingdom.
This volume contains :— I. Les maladies à Protozoaires. – II. Les mycoses des insectes. – III. Les maladies à ultravirus. – IV. L'infection bactérienne. – V. L'immunité antibactérienne naturelle et acquise. – VI. La symbiose chez les pucerons. – VII. Considérations économiques sur le rôle de la pa-

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